Install Guide

1.7.2
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Install Guide

Requirements

1. The Java Runtime Environment version 7 or later installed on the server machine.
2. A Java servlet container. Code Dx has been tested with Jetty and Tomcat.
3. An installation of MySQL to house the Code Dx data.
4. A copy of Code Dx. This will generally be a .zip file containing codedx.war, this guide, and a few other files.
5. For .NET analysis, the .NET runtime is required, and it is strongly recommended to install FxCop and CAT.NET. See the .NET Analysis section for additional information.
6. Dependency Check periodically updates its database of vulnerabilities. If Code Dx is installed in an environment without a connection to the internet, this update will not succeed.

.NET Analysis

In order to run the bundled .NET tools supported by Code Dx, the .NET runtime is required. It is recommended that the latest version of .NET be installed.

Code Dx is capable of running multiple .NET analysis tools on your codebase. FxCop and CAT.NET are two of the supported tools and are developed and distributed by Microsoft. The end-user license agreements for these products forbid their redistribution, therefore, Secure Decisions is unable to legally bundle these tools. So in order for Code Dx to run these tools on your behalf, you must install them separately. Code Dx will then automatically discover their location and run them.

Depending on the version of FxCop you plan to use, it will either be bundled with Visual Studio (as Code Analysis) or in the Windows SDK. For the best results, install Visual Studio 2012 or 2013 Premium. This will give you the latest rules available. Code Dx will automatically discover the location of the latest version of FxCop installed on your machine. If you would like to provide a specific location, set the fxcop.path property in the Code Dx configuration file. Code Dx supports versions 10, 11, and 12 of FxCop. Since FxCop 10, Microsoft has stopped shipping a stand-alone version of FxCop and instead ships it as part of Visual Studio. Despite the

Visual Studio dependency, it is recommended to install the latest version of Visual Studio to get the latest version of FxCop.

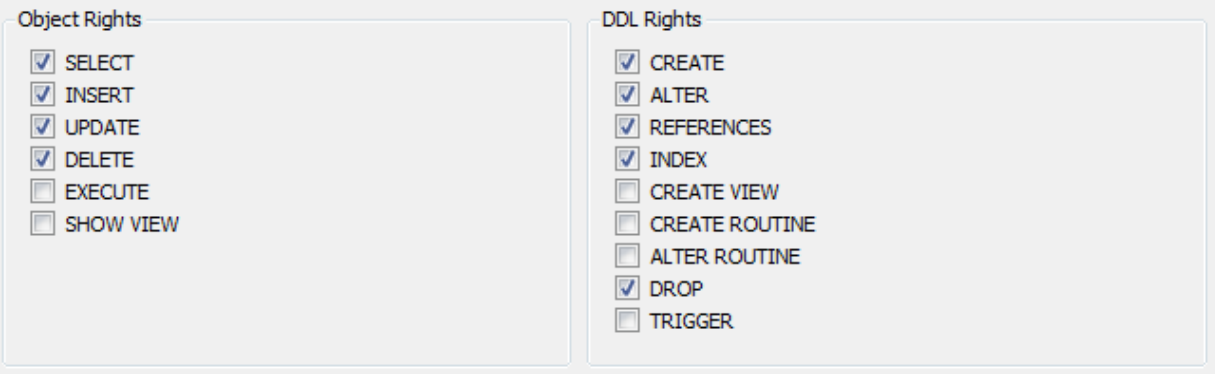
Code Dx will work with either CAT.NET 32-bit or CAT.NET 64-bit. CAT.NET 32-bit has an installer and Code Dx will automatically look in the default installation directory for this application. The 64-bit version is in a zip file. The best approach to using the 64-bit version is to overwrite the 32-bit files with the 64-bit files. Alternatively, the path can be manually set using the cat.net.path property in the Code Dx configuration file.

MySQL Database

An installation of MySQL is required for storage of Code Dx data. During the installation process, Code Dx will automatically create the tables it needs so it is strongly recommended that you setup a new schema just for Code Dx to avoid any contention with other applications using your MySQL installation. In addition, we recommend creating a database user just for Code Dx with permissions only to the Code Dx schema you create. Since Code Dx manages its own tables, the Code Dx user you setup will need the following permissions:

- For record storage and management:
  - SELECT
  - INSERT
  - UPDATE
  - DELETE
- For table creation and management:
  - CREATE
  - ALTER
  - REFERENCES
  - INDEX
  - DROP

In MySQL Workbench, under Users and Privileges > Schema Privileges (tab), you should see this:



It is recommended that the configuration be tweaked after installation, as some of the default settings may not be optimal. For instance, for improved performance, use of the InnoDB engine is recommended. MyISAM was the default engine for versions of MySQL prior to 5.5.5. There are other options that may be beneficial to tweak (e.g., innodb_buffer_pool_size). Since MySQL tuning is beyond the scope of this guide, we recommend consulting outside sources. A good place to start may be InnoDB performance optimization basics.

CodeDx Configuration

A series of configurations are required prior to installation. Please be aware that failure to do so will most likely result in runtime failures, or at the very least, unexpected behavior. There are several different pieces of configuration that need to be performed.

Understanding the AppData Directory

Code Dx needs a place to store a variety of files: the analysis run inputs it receives including the source code that it uses to display in the weakness details page; log files; and configuration files. We group all of these under what we call the Code Dx appdata directory.

Since Code Dx can be deployed on a variety of different platforms and servlet containers, we cannot make assumptions about where this appdata directory should be. As such, you must configure this before-hand.

There are two options available to tell Code Dx where its application data should be stored:

1. Set a Java System Property named codedx.appdata to the location of the

appdata folder, for the Java runtime that the server will run on. This is done by passing the command line argument `-Dcodedx.appdata="path/to/config"` to the `java` call that starts the server.

2. Set the `CODEDX_APPDATA` environment variable to the location of the appdata folder.

The location of the appdata directory may be an absolute or relative path. If you do not provide one of these options, Code Dx will fail to start. If you provide both, priority will be given to the Java System Property.

This folder should be kept intact during Code Dx upgrades. Therefore, it is recommended that it be stored in a stable location. Normally, you won't need to touch this folder after installing Code Dx, unless configuration tweaks are desired.

Configuration Files

License File

A valid Code Dx license is required to run Code Dx. Code Dx looks for the license file in the appdata directory when it starts up. The license file should have been provided to you when you received the instructions to download the Code Dx files. Place the license file (ending in `.lic`) in the Code Dx appdata directory and it will take effect the next time Code Dx starts up.

Log Configuration File

Code Dx uses Logback for logging. To configure Logback, add a `logback.xml` file to the appdata directory. An example Logback configuration will be provided in the `sampleConfig` folder of a distribution copy of Code Dx. For more information about the logging configuration, consult the Logback manual.

Code Dx Properties File

The most important configuration file is `codedx.props` ("the 'props' file"), which is expected to be located in the appdata directory. The 'props' file configuration determines a variety of settings including the database connection information, the analysis behavior, and Active Directory integration, among other things.

The 'props' file is formatted as a .properties file, using key-value pairs to set various

configuration fields. An example 'props' file is provided in the sampleConfig directory of a distribution copy of Code Dx.

Database Connection Config

As mentioned earlier, Code Dx requires a MySQL database for storage. Once MySQL is installed and configured as prescribed, you need to configure Code Dx with the approproate connection information. The following properties are used to configure Code Dx database connections:

- swa.db.url - The JDBC URL of the database Code Dx will be communicating with
- swa.db.driver - The name of the JDBC driver class to use for the connection
- swa.db.datasource - The name of the JDBC datasource class that will be used for the connection
- swa.db.user - The username that will be used to access the database
- swa.db.password - The password that will be used to access the database

For instance, to configure Code Dx to communicate with a MySQL database running on the same machine as the Code Dx server, with a username of "database_username" and password of "database_password" use the following configuration:

```
swa.db.url = jdbc:mysql://localhost/codedx
swa.db.driver = com.mysql.jdbc.Driver
swa.db.user = database_username
swa.db.password = database_password
swa.db.datasource = com.mysql.jdbc.jdbc2.optional.MysqlDataSource
```

Active Directory Configuration

Code Dx allows you to create and delete new users that are only known to the Code Dx system. You may, however, want to let users use the same credentials as they do for your organization. To facilitate this, you must set up an Actve Directory configuration in the properties file using the shiro.activedirectory.realm, shiro.activedirectory.url, and shiro.activedirectory.searchbase properties shown in this example:

```
shiro.activedirectory.realm = org.apache.shiro.realm.activedirectory.ActiveDirectoryRealm
shiro.activedirectory.url = ldap://172.17.17.8:389/
shiro.activedirectory.searchbase = dc=avi,dc=com
```

Git Related Configuration

Code Dx allows you to configure each project to automatically use source from a git repository as input for each analysis. When configuring a connection to a git repository, Code Dx will, by default, disallow the usage of “local” URLs (i.e., URLs that point to a file in Code Dx’s own file system). This is enforced as a security measure to prevent system information exposure via the validation user interface. Although it is strongly recommended that this setting be left disabled, in the exceptional cases where it is necessary to use local git repositories, set the git.config.allow-local-urls property to true.

Analysis Behavior

Various settings allow you to affect Code Dx's behavior regarding the analysis runs it conducts.

1. By default, Code Dx will store the last 5 copies of your analyses per project. To change that behavior you should change the value of the swa.storage.num-analysis-runs-to-keep property in the properties file.

2. For the analyses that are stored, Code Dx will, by default, maintain a copy of the raw inputs it received for processing. While these inputs are not used by Code Dx once it finishes the analysis process, they are kept around for archival purposes. If storage space is an issue, the swa.storage.keep-raw-inputs can be set to false to prevent Code Dx from storing the raw inputs.

3. Code Dx bundles various static analyzers that run independently during the analysis process. Each of these tools requires a memory budget during its own analysis. The memory requirements vary based on the sizes of the codebases the analyzers are checking. The memory budget for each of these tools is configurable in the properties file; each of the following settings specify the number of megabytes allotted to their respective tools. In general, the static analyzers will require more memory in order to analyze larger projects.

    - java.tools.maxmemory determines the maximum heap size for java-based tools. Default is 1024 (1GB).
    - ruby.tools.maxmemory determines the maximum heap size for Ruby-based tools, which are run with Java via JRuby. Default is 1024 (1GB).
    - python.tools.maxmemory determines the maximum heap size for Python-

based tools, which are run with Java via Jython. Default is 1024 (1GB).
    - cat.net.maxmemory determines the maximum allowed memory usage for CAT.NET. Default is 2048 (2GB).

Changing any of the analysis behavior properties can be done at any time after the initial installation, however, you will still need to restart the server in order to reload the properties.

Remember-Me Config

As a user convenience, Code Dx can optionally remember users' logged-in state on trusted devices. Although support for this feature is turned on by default, this can be changed to one of three levels via the swa.user.rememberme field in the properties file. The supported configuration values are:

- full - Code Dx will remember any user who logs in. Once logged in, users will not need to log in via the login form even after their session expires. They will be remembered by a special cookie, until that cookie expires. The rememberMe cookie does not contain the user's password in any way, shape, or form.
- username-only - Code Dx will remember the username of any user who logs in. This is used to auto-fill the username field of the login form. Users are remembered by a cookie, until that cookie expires. This cookie simply contains the user's name.
- off - Code Dx will not remember anything about a user once that user's session expires or if they log off.

Note: for full and username-only modes, users can opt-out of being remembered by Code Dx by unchecking the "remember me" checkbox in the login form.

JVM Configuration

For CodeDx to run properly, the servlet container needs to be started with the correct options. This is generally most easily done by modifying the value of the SERVER_OPTS environment variable to include the correct arguments.

Java 7 and earlier

We recommend increasing the amount of space allocated for PermGen to at least 256mb by including -XX:MaxPermSize=256m as an argument when you start your

server.

Java 8

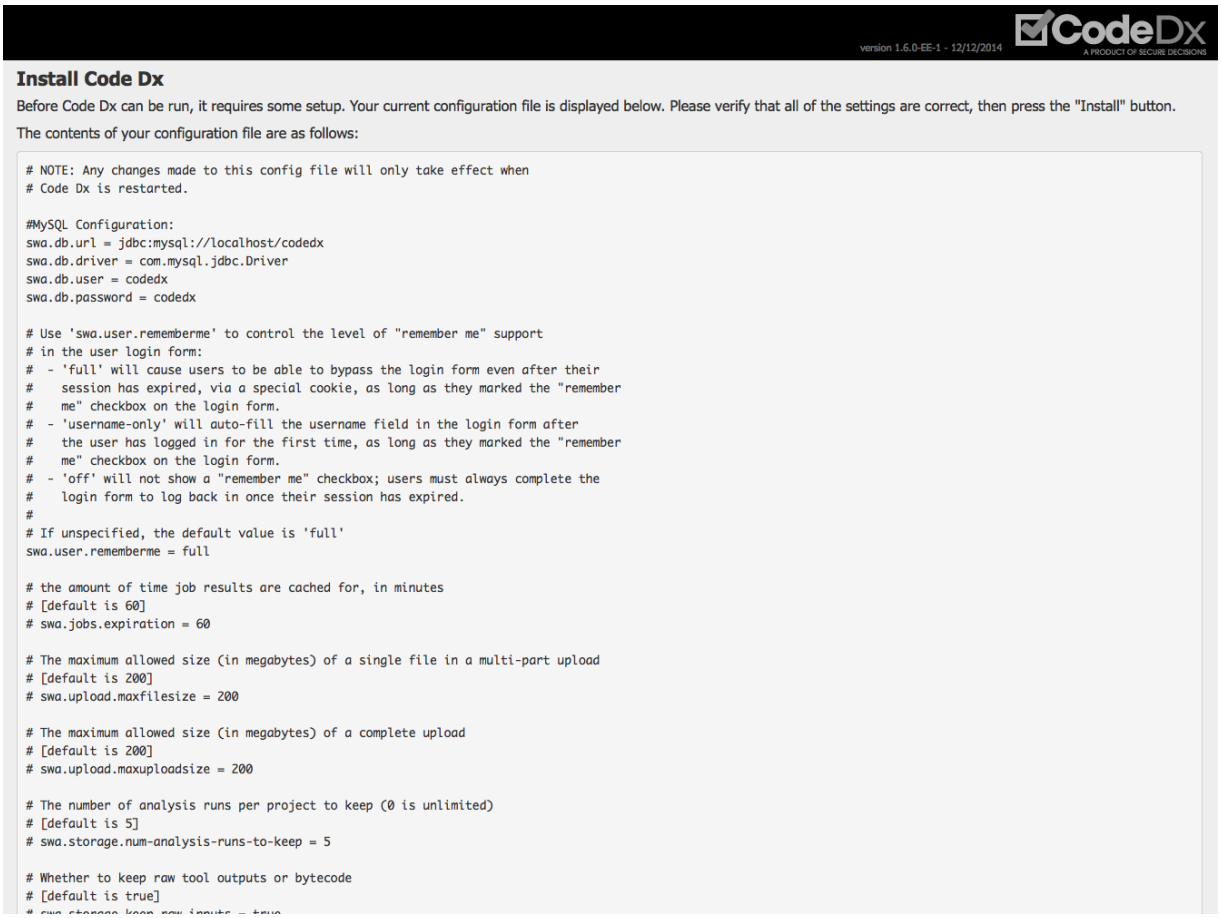
Java 8 doesn't allocate specific PermGen space, instead using any available system memory for its "metaspace," which means that there's no need to enlarge the PermGen space if you're running CodeDx with Java 8.

Installation

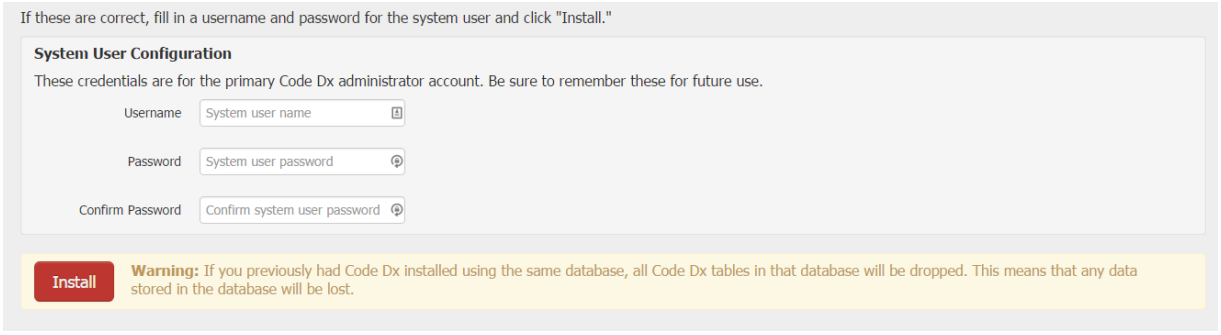
Once configuration is ready, installation should be relatively straight-forward. Deploying the codedx.war file to your servlet container is the next step. This varies from one application server to the next as well at the configuration and deployment options enabled on your server. Please refer to your servlet container user manual for instructions on deploying war packages.

First Startup

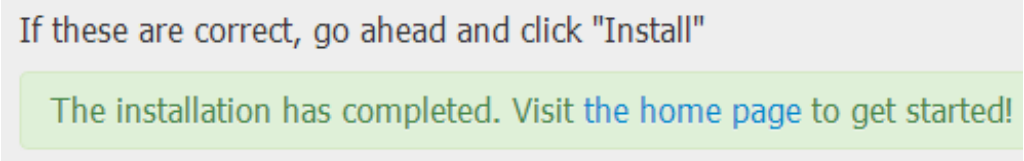
Once Code Dx is deployed, if configured properly, you should be able to navigate to the deployment URL (e.g., https://myservletcontainer/codedx/) and see the installation screen.


version 1.6.0-EE-1 - 12/12/2014
CodeDx
A PRODUCT OF SECURE DECISIONS
Install Code Dx
Before Code Dx can be run, it requires some setup. Your current configuration file is displayed below. Please verify that all of the settings are correct, then press the "Install" button.
The contents of your configuration file are as follows:
NOTE: Any changes made to this config file will only take effect when
Code Dx is restarted.
#MySQL Configuration:
swa.db.url = jdbc:mysql://localhost/codedx
swa.db.driver = com.mysql.jdbc.Driver
swa.db.user = codedx
swa.db.password = codedx
# Use 'swa.user.rememberme' to control the level of "remember me" support
# in the user login form:
# - 'full' will cause users to be able to bypass the login form even after their
# session has expired, via a special cookie, as long as they marked the "remember
# me" checkbox on the login form.
# - 'username-only' will auto-fill the username field in the login form after
# the user has logged in for the first time, as long as they marked the "remember
# me" checkbox on the login form.
# - 'off' will not show a "remember me" checkbox; users must always complete the
# login form to log back in once their session has expired.
#
# If unspecified, the default value is 'full'
swa.user.rememberme = full
# the amount of time job results are cached for, in minutes
# [default is 60]
# swa.jobs.expiration = 60
# The maximum allowed size (in megabytes) of a single file in a multi-part upload
# [default is 200]
# swa.upload.maxfilesize = 200
# The maximum allowed size (in megabytes) of a complete upload
# [default is 200]
# swa.upload.maxuploadsize = 200
# The number of analysis runs per project to keep (0 is unlimited)
# [default is 5]
# swa.storage.num-analysis-runs-to-keep = 5
# Whether to keep raw tool outputs or bytecode
# [default is true]

You will need to set the username and password for the admin user.**Please be mindful of your selection for these settings since once set, there is no way to recover this information if forgotten or lost.** You will, however, be able to change the admin user password when needed from within Code Dx.


If these are correct, fill in a username and password for the system user and click "Install."
System User Configuration
These credentials are for the primary Code Dx administrator account. Be sure to remember these for future use.
Username
System user name
Password
System user password
Confirm Password
Confirm system user password
Install
Warning: If you previously had Code Dx installed using the same database, all Code Dx tables in that database will be dropped. This means that any data stored in the database will be lost.

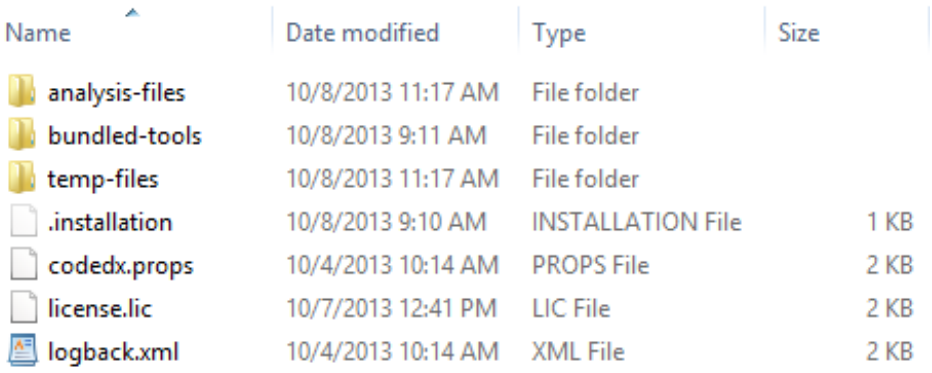
After reviewing the configuration and entering the desired admin user credentials, press the "Install" button. You should see a message saying that the "installation process has started", with a blue background. Once it's finished you should see this:



Reinstallation

If you need to reinstall Code Dx you can perform the following steps. However, please be mindful that **this is a destructive process that will result in data loss** Please only do so when the data managed by Code Dx is not intended to be preserved.

When Code Dx was first installed, it created a variety of files and folders in the appdata folder. Here are the contents of an example config folder after installation:



In short, to reinstall, simply make any changes you want to the codedx.props file, delete the .installation file and the following directories: analysis-files; bundled-tools. Finally, restart your servlet container and, using your browser, navigate to the Code Dx deployment URL. From there, Code Dx will show you the installation page and will proceed to install Code Dx again.